repeat hematocrit was 23%. The child's dose of ferrous sulfate was adjusted to her new weight and the mother was counseled once again regarding diet. A return appointment was given for one week later.

The mother missed her next appointment but did return three weeks later. She again reported the adequacy of the child's diet, could precisely recall how much therapeutic iron she was giving her child and denied any bleeding problems. A complete blood count done at this clinic showed a hemoglobin of 6.6 grams per dl and a hematocrit of 20% with microcytic and hypochromic indices.

It was decided to admit this child to hospital for further evaluation and also to investigate the home situation.

Laboratory evaluation elicited the following values: hematocrit 19.1%, hemoglobin 5.7 grams per dl, leukocyte count 12,600 per $\mu$l (26% polymorphonuclear leukocytes, 1% bands, 69% lymphocytes and 4% monocytes); erythrocyte count 235,000 per $\mu$l, mean corpuscular volume 49 cu microns, mean corpuscular hemoglobin 14 pg, a peripheral smear showing microcytic and hypochromic erythrocytes, serum ferritin less than 1 ng per ml (normal 7 to 140), serum iron 14 $\mu$g per dl (normal 30 to 70), total iron binding capacity 411 $\mu$g per dl (normal 250 to 400), percent saturation 3.5% (normal 10% to 50%); results of hemoglobin electrophoresis, urinalysis and electrolytes were normal; blood urea nitrogen 9 mg per dl and creatinine 0.3 mg per dl. A diagnosis of severe iron deficiency anemia was made and therapeutic dosages of ferrous sulfate were started.

Seven days after therapy was initiated in the hospital, the hematocrit had risen to 31% with a reticulocyte count of 4.8%. Stool guaiacs were negative throughout her hospital stay. The child was noted to be developmentally normal, although the only words she was heard to utter were "shut up."

Investigation of the home revealed domestic turmoil. The mother had recently separated from her husband and moved out of the house with her two children. When told that her child's anemia was most likely the result of dietary deficiency of iron and noncompliance with iron therapy, the mother's affect remained flat. She continued to maintain that she diligently provided her child with sources of dietary and supplemental iron. The mother did, however, admit that her child had always been a source of trouble, even during pregnancy, and that this child was different from her older one.

After a seven-day stay in hospital, the child was discharged home to the mother on a regimen of appropriate doses of liquid ferrous sulfate. Follow-up with Child Protective Services and a public health nurse was arranged to help assure compliance, and the child's anemia was completely corrected. The mother was referred to mental health services for counselling. The father, however, gained custody of the children two months after hospitalization when the mother failed both mental health and pediatric clinic appointments.

Following this, the child had one other admission to hospital for a simple febrile seizure at 18 months of age. Otherwise, the patient continued to do well and to have normal blood counts.

## Discussion

This is an unusual case that shows how a mother elected to remove all available iron from her child's diet, yet provided an adequate diet and environment to ensure normal growth and development. This type of illness, one that is induced by another, could be classified as covert child abuse or Münchausen by proxy.[13] Anemia is a common childhood ailment that can easily be diagnosed by dietary history and response to iron therapy.[14] The correct diagnosis in this case, as in other forms of covert child abuse, is frequently delayed because of a misleading history, delay in seeking medical attention and failure to comply with medical advice. In cases of unusual signs, symptoms or illness in children, one should always consider covert child abuse in the differential diagnosis.

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# Metoclopramide-Induced Reversible Impotence


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METOCLOPRAMIDE, a drug used to enhance gastrointestinal motility and to control nausea, is known to be a central dopamine-receptor blocker and by that mechanism to lead to hyperprolactinemia. The side effects of metoclopramide are mainly central nervous system-mediated effects such as somnolence, extrapyramidal reactions and agitation. In this report, I describe two cases of reversible metoclopramide-induced impotence and discuss the implications of this association in view of the known pharmacology of the drug.

## Reports of Cases

*Case 1*

The patient, a 62-year-old man, was admitted to hospital for recurrent nausea and vomiting. The patient had a 16-year history of ulcer disease and 5 years earlier had an antrectomy

(Berlin RG: Metoclopramide-induced reversible impotence. West J Med 1986 Mar; 144:359-361)

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and vagotomy with a Billroth I reconstruction. He had been using large amounts of aspirin, ten or more tablets a day, for muscle tension headaches and had been doing so for a year before his present hospital admission. He did not drink alcohol but he did smoke 1½ packs of cigarettes a day. At endoscopy, done two weeks before admission, he had a duodenal ulcer, severe esophagitis and gastritis, a perianastomotic ulcer at the site of his gastroduodenostomy, retained food in the gastric pouch and pronounced bile reflux. Multiple serum gastrin levels measured over the course of his illness had all been normal. At the time of his endoscopy a regimen of metoclopramide hydrochloride, 10 mg, and cimetidine, 300 mg, both four times a day, was started.

On examination, the positive findings were limited to slight wasting, a succussion splash and guaiac-positive stool. A complete blood count and chemistry profile were normal, as were a two-hour urinary amylase, serum vitamin $B_{12}$ and serum gastrin values. The patient was treated with hyperalimentation and nasogastric suction as well as intravenous administration of cimetidine and metoclopramide. Sucralfate was also given by mouth at a dosage of one gram four times a day. A repeat endoscopy a week after admission showed healing of his ulcers and inflammation and he tolerated resuming oral intake. He was subsequently discharged on a regimen of sucralfate and cimetidine at the dosage used in hospital and metoclopramide, 10 mg six times per day.

Three months later, 1½ months after cimetidine use had been discontinued, the patient presented on routine follow-up with a complaint of the recent onset of impotence, including loss of morning erections. Examination showed him to be well nourished with normal general findings. He had no gynecomastia or galactorrhea, his visual fields to confrontation were normal and his testicles were normal. A serum prolactin level was elevated at 81 pg per ml (0 to 15) and the serum testosterone level was 397 pg per ml (300 to 1,000). The serum thyroxine value was 8.0 μg per ml (4.5 to 11.5). A computed tomographic scan of the head showed no evidence of a hypothalamic or pituitary tumor.

The dosage of metoclopramide was decreased to 10 mg three times per day when he presented with impotence and its use was stopped completely when the prolactin level was returned two weeks later. One month after cessation of the drug therapy, the serum prolactin level had fallen to 5 pg per ml. Two months after stopping the metoclopramide therapy, the patient reported resuming normal sexual function. In the subsequent five months he has continued to have normal erections.

*Case 2*

The patient, a 72-year-old man with reflux esophagitis, was treated with a regimen of metoclopramide, 10 mg four times a day. He was taking no other medications. About two months later he had the new onset of impotence. Three weeks after cessation of this drug therapy, his sexual function returned to normal and, in the subsequent four months, he has had no further sexual dysfunction.

## Discussion

Metoclopramide, a chlorinated derivative of procainamide,[1] is an antiemetic and acts to increase motility of the gastrointestinal tract, especially the proximal portions. Many studies have shown that prolactin levels rise immediately[2-4] and remain elevated with prolonged administration of metoclopramide in clinically used dosages.[5] Hyperprolactinemia in men can cause delayed puberty, decreased libido, impotence, infertility, galactorrhea and gynecomastia and, in women, in addition, menstrual abnormalities and amenorrhea.[6]

Falaschi and co-workers, in a study of five normal men given 10 mg of metoclopramide three times a day, showed that mean serum prolactin levels rose from 7.9 ± 2.2 ng per ml to 60.6 ± 9.6 ng per ml after one week.[7] In two of the men galactorrhea developed, four noted a decreased libido and three lost spontaneous erections. At four weeks all subjects also had a decreased seminal volume and total sperm count. At one week after cessation of the use of metoclopramide, the mean serum prolactin level had dropped to 12.1 ± 9.3 ng per ml.

In women, Aono and colleagues noted that the average time from initiation of metoclopramide therapy to the onset of galactorrhea was 27.2 ± 5.8 days in five treated patients and the time after therapy to the disappearance of galactorrhea was 56.6 ± 12.1 days.[8] A case of hyperprolactinemic amenorrhea induced by the use of metoclopramide showed the onset of amenorrhea two months after starting the drug therapy and resumption of menses three weeks after its cessation.[9]

Although hyperprolactinemia is well recognized as a side effect of metoclopramide use, the package insert does not list either impotence or amenorrhea as a reported side effect and mentions them only by stating that although these disturbances have been observed with prolactin-elevating drugs, the "clinical significance of elevated prolactin levels is unknown for most patients" (Reglan Package Insert, A. H. Robbins Pharmaceutical Division, Aug 1984). In a review of drug-induced sexual dysfunction in older men, the authors mention the studies cited above but provide no further case evidence.[10] Similarly, Trimmer notes the association of impotence and metoclopramide.[11]

In view of the many actual or proposed uses for metoclopramide both for gastrointestinal and nongastrointestinal diseases, the implication of the association with drug-induced impotence or female sexual dysfunction is potentially significant.[12-14] Because many patients are reluctant to discuss their sexual functioning or fail to recognize that changes in function may be related to pharmacologic agents, it is imperative that physicians be aware of the association and specifically monitor the patients for these possible side effects. This caveat applies equally to women, in whom the dysfunction may be even less obvious. In view of the experimental evidence of the ubiquitous nature of hyperprolactinemia induced by metoclopramide use, closer surveillance may reveal that the occurrence of sexual dysfunction has been seriously underestimated due to lack of appropriate observation.

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# Bronchial Stenosis

## A Complication of Healed Endobronchial Tuberculosis

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SEVERAL RECENT REPORTS have described endobronchial tuberculosis.[1-5] Development of bronchial stenosis is a major complication of this disorder.[6-9] Thus far, the chronicity of symptoms related to these cicatricial lesions has been underemphasized. We examined a patient who had persistent stenosis of her left main-stem bronchus 10 and 20 years after endobronchial tuberculosis was diagnosed and treated.

### Report of a Case

The patient, a 58-year-old woman, was seen at LDS Hospital late in August 1981 because of a two-year history of progressive dyspnea on exertion (exercise tolerance was limited to climbing one flight of stairs) and inspiratory wheezing. This problem had failed to respond to bronchodilator therapy. She said she had not previously smoked but she had a history of allergic rhinitis. In July 1961, she had a workup at the same hospital for chest tightness, nonproductive cough, low-grade fever and generalized malaise and was diagnosed as having tracheobronchial tuberculosis. Bronchoscopy showed a gray-granular exudative membrane with thickening of the bronchial mucosa extending upward from the left main-stem bronchus and involving the lower fourth of the lateral wall of the trachea. Narrowing of the left main-stem and the left upper lobe bronchi was noted. Her tuberculin skin test was positive. Sputum smears, bronchial washings and biopsy specimens were positive for acid-fast bacilli organisms, but these were not recovered in cultures. Treatment consisted of isoniazid (INH), para-aminosalicylic acid and streptomycin for 18 months with "complete" remission of her symptoms. She had a relapse in February 1963, however, and was again treated with isoniazid, para-aminosalicylic acid and streptomycin for an additional 18 months. Thereafter, she noted relief of her symptoms and remained asymptomatic until 1969 when wheezing without cough was noted. Wheezing persisted for two years. Because of suspected bronchial stenosis, bronchoscopy was done in April 1971, at which time well-epithelialized, 1-mm thick, "weblike" formations were found circumferentially narrowing the left main-stem and left lower lobe bronchi. No evidence was found of active bronchitis or tuberculosis, however. These bronchi were easily dilated with the bronchoscope. Following this procedure her wheezing ceased and, except for allergic rhinitis and sinusitis, she remained asymptomatic for eight years. Wheezing and dyspnea then developed on exertion and over the following three years she experienced a yearly episode of left lower lobe pneumonia. Following her last episode, she was referred for evaluation.

On admission physical examination, she had prolonged inspiration with a localized inspiratory wheeze over the mid to upper left parasternal area. Chest radiograph and air-contrast tracheal tomograms were within normal limits.

Pulmonary function studies showed moderate airflow obstruction that did not improve following bronchodilator administration, normal lung volumes by single-breath helium dilution and normal carbon monoxide diffusion capacity.

Bronchoscopy showed a narrowed left main-stem bronchus that would not permit passage of a 4-mm diameter fiber-optic bronchoscope. No evidence of acute or chronic inflammation was noted. Bronchograms showed narrowing of the left main and lower lobe bronchi but normal bronchial anatomy (left upper and lower lobes) distal to the obstructions (Figure 1).

About four weeks later, ventilation (using xenon 133) and perfusion scans (using technetium Tc 99m aggregated albumin) were done. Diminished ventilation to the left upper and lower lobes and delayed washout in the same regions were noted. Perfusion of the left lung was 31% of total pulmonary perfusion.

Because of recurrent pneumonia, a left pneumonectomy

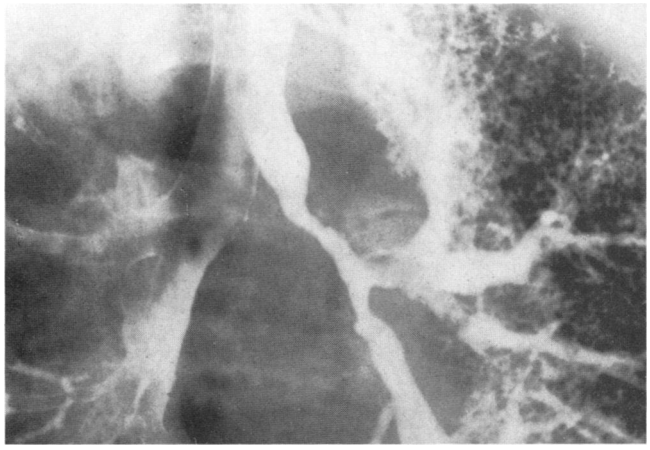

**Figure 1.**—Selective bronchogram shows stenosis of the left main and lower lobe bronchi.

(Smith JL, Elliott CG, Schmidt CD, et al: Bronchial stenosis—A complication of healed endobronchial tuberculosis. West J Med 1986 Mar; 144:361-362)

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